

WHAT IS CLAIMED IS:

1. A method of treating one or more lesions in a vessel, the vessel having a main branch and a side branch branching from the main branch at a bifurcation, the method comprising:

positioning a delivery catheter in the main branch;
deploying a first stent from the delivery catheter in the main branch;
positioning the delivery catheter in the side branch; and
deploying a second stent from the delivery catheter in the side branch;
wherein the delivery catheter is not removed from the vessel between

deploying the first and second stents.

2. A method as in claim 1 further comprising deploying a third stent from the delivery catheter in the main branch or side branch without removing the delivery catheter from the vessel.

3. A method as in claim 1 wherein the delivery catheter is positioned through an opening in a sidewall of the first stent to deploy the second stent.

4. A method as in claim 1 wherein the first and second stents each comprise a plurality of separable segments.

5. A method as in claim 1 wherein the first stent has a different length than the second stent.

6. A method as in claim 1 wherein the first stent is deployed before the second stent.

7. A method as in claim 1 wherein the second stent is deployed before the first stent.

8. A method as in claim 1 wherein the first stent and the second stent each have a portion in the main branch.

9. A method as in claim 1 further comprising adjusting the length of the first stent before deploying the first stent while the delivery catheter remains in the vessel.

10. A method as in claim 1 further comprising adjusting the length of the second stent before deploying the second stent while the delivery catheter remains in the vessel.

11. A method as in claim 1 further comprising dilating at least one lesion in the vessel using an expandable member on the delivery catheter before deploying at least one of the first and second stents.

12. A method of treating one or more lesions in a vessel, the vessel having a first branch and a second branch meeting at a bifurcation, the method comprising:

positioning a delivery catheter in the first branch;

deploying a first stent from the delivery catheter in the first branch, a portion of the first stent being disposed across the bifurcation;

positioning the delivery catheter in the second branch through an opening in a sidewall of the first stent; and

deploying a second stent from the delivery catheter, at least a portion of the second stent being disposed in the second branch;

wherein the delivery catheter is not removed from the vessel between deploying the first and second stents.

13. The method of claim 12 further comprising dilating the opening in the sidewall of the first stent by expanding an expandable member on the delivery catheter.

14. The method of claim 13 wherein before dilating, the opening in the sidewall of the first stent is I-shaped.

15. The method of claim 12 wherein first stent has a first portion with a plurality of first slots and a second portion with a plurality of second slots, the first slots being larger than the second slots.

16. The method of claim 15 wherein the opening in the sidewall of the first stent comprises one of the first slots, and wherein the first stent is deployed so that at least one of the first slots is aligned with bifurcation.

17. The method of claim 12 wherein the first stent has a different geometry than the second stent.
18. The method of claim 12 wherein the first stent has a different length than the second stent.
19. The method of claim 12 wherein deploying the first stent comprises expanding an expandable member on the delivery catheter.
20. The method of claim 19 wherein deploying the second stent comprises expanding the expandable member on the delivery catheter.
21. The method of claim 19 wherein at least one of the first and second stents comprises a plurality of separable segments.
22. The method of claim 12 further comprising dilating at least one lesion in the vessel using an expandable member on the delivery catheter before deploying at least one of the first and second stents.
23. A stent delivery device for treating one or more lesions in a vessel having a bifurcation, the bifurcation including a main branch and a side branch, the stent delivery device comprising:
 - a catheter shaft;
 - a first stent carried by the catheter shaft configured for deployment in the main branch;
 - a second stent carried by the catheter shaft configured for deployment in the side branch; and
 - a deployment mechanism for deploying the first and second stents independently of each other.
24. A stent delivery device as in claim 23 wherein the deployment mechanism comprises an expandable member coupled to the catheter shaft, the first and second stents being positionable on the expandable member for expansion thereby.
25. A stent delivery device as in claim 24 further comprising a sheath slidably disposed over the expandable member, the sheath being positionable to restrain a

first portion of the expandable member while allowing expansion of a second portion of the expandable member.

26. A stent delivery device as in claim 24 wherein the expandable member is configured for dilation of the vessel without deploying either of the first and second stents.

27. A stent delivery device as in claim 23 wherein the first and second stents are self-expanding.

28. A stent delivery device as in claim 23 wherein at least one of the first and second stents has a sidewall opening that can be widened following stent deployment.

29. A stent delivery device as in claim 28 wherein the other of the first and second stents is positionable through the sidewall opening.

30. A stent delivery device as in claim 28 wherein the sidewall opening is in a first wall portion of the first or second stent, the first or second stent further having a second wall portion, the second wall portion having a different geometry, material or shape than the first wall portion.

31. A stent delivery device as in claim 30 wherein the second wall portion is balloon expandable, and the first wall portion is self-expanding.

32. A stent delivery device as in claim 30 wherein the first wall portion has a lower density of material per unit length than the second wall portion.

33. A stent delivery device as in claim 23 wherein the second stent has a different geometry, shape, or size than the first stent.

34. A stent delivery device as in claim 23 further comprising a third stent carried by the catheter shaft and deployable independently of the first and second stents.

35. A stent delivery device as in claim 23 wherein a length of at least one of the first and second stents can be selected in situ.

36. A stent delivery device as in claim 23 wherein at least one of the first and second stents comprises a plurality of separable stent segments.